

1 **Obstetric Anal Sphincter Injury:**  
2 **A Systematic Review of Information Available on the Internet**

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9  
10 On behalf of CHORUS: An International Collaboration Harmonising Outcomes, Research,  
11 and Standards in Urogynaecology

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33  
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35 **X words**

36

37 **Condensation:**

38 Online information concerning obstetric anal sphincter injury is of poor quality.

39

40 **Short title:**

41 Obstetric Anal Sphincter Injury: A Systematic Review of Online Information.

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74 **Abstract**

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76 **Background**

77 The internet is an important source of health information, however, there is no clear  
78 governance pertaining to quality.

79

80 **Objective**

81 We evaluated the accuracy, credibility, reliability, and readability of online information  
82 concerning obstetric anal sphincter injury.

83

84 **Study design**

85 Five popular search engines, aol.com, ask.com, google.com, bing.com, and yahoo.com  
86 were searched using the popular keywords including birth trauma, third degree tear, and  
87 fourth degree tear. The first thirty webpages were identified for each keyword and were  
88 considered eligible if they provided information regarding obstetric anal sphincter injury.

89 Eligible webpages were assessed by two independent researchers for (1) accuracy  
90 (prioritised criteria based upon the Royal College of Obstetricians and Gynaecologists Third  
91 and Fourth Degree Tear guideline, range 0-9); (2) credibility (White Paper instrument, range  
92 0-10); (3) reliability (DISCERN instrument, range 0-85); and (4) readability (Flesch-Kincaid  
93 instrument, range 0-100). Inter-rater reliability of assessments was evaluated using intra-  
94 class co-efficient. We summarised these data in diagrams, tables, and narratively.

95

96 **Results**

97 Fifty-eight webpages were included. Seventeen webpages had obtained Health-Online the  
98 Net certification or Information Standard approval. No webpage performed consistently well  
99 over the four domains of assessment. One webpage fulfilled the entire criteria for accuracy:  
100 tamesidehospital.nhs.uk. Webpages performed poorly when considering risk factors (23/58),

101 diagnosis (16/58), and prognosis (12/58). Webpages performed better with regards to  
102 credibility, for example webpages were frequently assessed as being useful (51/58),  
103 highlighted research evidence relevant to the information being presented (44/58), and  
104 provided information regarding author credentials and affiliations (30/58). Over a third  
105 (21/58) were assessed as unreliable. Only two webpages were assessed as being written in  
106 plain English.

107

### 108 **Conclusion**

109 Information currently available on the internet concerning obstetric anal sphincter injury often  
110 uses language which is inappropriate for a lay audience and lacks sufficient accuracy,  
111 credibility, and reliability. Healthcare professionals should be aware that online information  
112 pertaining to obstetric anal sphincter injury is poor quality. Providers of online information  
113 should be strongly encouraged to adhere to regulations such as the Health on the Net  
114 Foundation accreditation.

115

### 116 **Keywords:**

- 117 1. Accuracy
- 118 2. Credibility
- 119 3. Obstetric Anal Sphincter Injury
- 120 4. Online Information
- 121 5. Quality
- 122 6. Systematic Review

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## 129 **Introduction**

130 Obstetric anal sphincter injuries (OASI) following vaginal deliveries are severe perineal tears  
131 and encompass third-degree tears, injury involving the anal sphincter complex, and fourth-  
132 degree tears, injury involving the anal sphincter complex and anal mucosa.(1) The risk of  
133 such injuries is estimated to be 5% in nulliparous women and over 7% in higher risk  
134 groups.(2) The true prevalence of obstetric anal sphincter injury is unknown, however, it is  
135 likely to be higher than estimated, as occult injury is not recognised during clinical  
136 examination but is evident on endoanal ultrasound.(3) Short-term management of obstetric  
137 anal sphincter injuries requires immediate surgical repair. Repairs are performed by an  
138 appropriately trained clinician, preferably in an operating theatre under regional analgesia.(4)  
139 Post-operatively analgesia, antibiotic prophylaxis, laxatives, and pelvic floor physiotherapy  
140 are recommended.(4) Obstetric anal sphincter injuries are associated with significant  
141 morbidity including anal incontinence, urinary incontinence, and sexual dysfunction (5-7).  
142 Potential long-term morbidity, difficulties during the convalescence period, and anxieties  
143 regarding future births often motivate women, partners, and families to seek online  
144 information regarding obstetric anal sphincter injuries.

145

146 The internet is perceived as an important source of health information among patients and is  
147 increasingly used (8). Young women are more likely to use the internet for this purpose with  
148 pregnancy and childbirth accounting for over a fifth of all health-related searches.(9) Patients  
149 can access information about their condition, share experiences with others, and utilise  
150 support networks anonymously and conveniently. However, the quality of information online  
151 can be variable and inaccurate information can be related to adverse outcomes and poor  
152 decisions regarding treatment (10).

153

## 154 **Objective**

155 To date, there is no systematic evaluation of online health information pertaining to obstetric  
156 anal sphincter injury. We assessed the accuracy, credibility, reliability, and readability of  
157 webpages providing information on the diagnosis and management of obstetric anal  
158 sphincter injury.

159

## 160 **Methods**

161

### 162 **Sources**

163 A protocol with explicitly defined objectives, criteria for World Wide Web page selection, and  
164 approaches to assessing accuracy, credibility, reliability, and readability was developed.

165 The protocol is registered with the International Prospective Register of Systematic Reviews  
166 (PROSPERO), registration number: CRD42017078212. This systematic review was  
167 reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta  
168 -analyses (PRISMA) guidance.(11)

169

### 170 **Identification of webpages**

171 A comprehensive search strategy was developed. During September 2017, we searched  
172 five popular search engines: aol.com, ask.com, bing.com, google.com, and yahoo.com.

173

### 174 **Search term selection**

175 Google.com keyword planner and semrush.com were used to define, select, and evaluate  
176 the most relevant keywords related to obstetric anal sphincter injury. A long list of terms and  
177 phrases were evaluated within google.com keyword planner, terms yielding fewer than 100  
178 monthly searches were excluded. We used the following search terms: (1) perineal trauma  
179 (1000 searches per month), (2) perineal tear (100,000 searches per month), (3) perineal  
180 laceration (10,000 searches per month), (4) obstetric trauma (1000 searches per month), (5)  
181 third degree tear (10,000 searchers per month), (6) fourth degree tear (1000 searches per

182 month), (7) vaginal tear (100,000 searches per month), and (8) obstetric anal sphincter injury  
183 (100 searchers per month).

184

185 We reviewed webpages identified by search terms on the first three pages per search  
186 engine. The search was limited as the vast majority of internet users do not seek information  
187 from webpages listed past the first three pages returned by a search engine.(12). Location  
188 services were disabled to reduce geographical bias.

189

190 We organised the webpages and two researchers (VG and VP) screened the webpages for  
191 eligibility based on predetermined eligibility criteria. Webpages were considered eligible if  
192 they provided information about obstetric anal sphincter injury such as the classification of  
193 tears, associated risk factors, preventative methods, diagnosis, treatment by surgical repair,  
194 prognosis, post-operative management, follow up, and mode of delivery in future  
195 pregnancies. Websites were excluded for the following reasons: language other than in  
196 English; citations of scholarly articles; advertisements for products, hospitals, and clinicians;  
197 personal experience or blogs; videos resources; password protected sites; and material  
198 aimed at medical professionals. Discrepancies were resolved by a third reviewer (SKD).

199

200 Eligible webpages were saved in an electronic form and duplicates removed. Two  
201 independent researchers (VG and VP) extracted webpage characteristics and assessed  
202 accuracy, credibility, reliability, and readability.

203

#### 204 **Webpages characteristics**

205 Two researchers (VG and VP) independently extracted website characteristics using a  
206 piloted data extraction Microsoft Excel sheet. Webpage characteristics extracted included  
207 country of origin, listed authors, disease specific, patient focused, presence of a patient  
208 forum, privacy statement, source of funding, and external editorial approvals. Discrepancies  
209 were resolved by a third reviewer (SKD).

210

211 **Quality assessment**

212 Webpages were assessed for accuracy, credibility, reliability, and readability. Researchers  
213 were trained to evaluate:

214 (1) accuracy prioritised criteria based upon the Royal College of Obstetricians and

215 Gynaecologists (RCOG) *Third and Fourth Degree Tear* guideline, range 0-9;(4)

216 (2) credibility White Paper instrument, range 0-10;(13)

217 (3) reliability DISCERN instrument, range 0-85;(14) and

218 (4) readability Flesch-Kincaid instrument, range 0-100.(15)

219 Two researchers (VG and VP) independently assessed each webpage.

220

221 Accuracy of information presented on webpages was assessed by a prioritised nine-item  
222 criterion (Appendix A). This was formulated and guided by evidence-based

223 recommendations from the Royal College of Obstetricians and Gynaecologists guideline,

224 *Third and Fourth Degree Tears 2015*.(4) Recommendations pertaining to classification,

225 risks, preventative strategies, diagnosis, surgical treatment, and further management of

226 obstetric anal sphincter injury were extracted from the guideline. With regards, to surgical

227 repair, details of standardised repair technique were omitted. Each criterion was scored the

228 following: zero for not mentioned or incorrectly mentioned, one for partially mentioned and

229 two for correctly mentioned; total scores ranged from zero to 18.

230

231 The White Paper instrument was developed for healthcare users to critically appraise the

232 credibility of online information using the following criteria.(13) Credibility was assessed

233 using 10-point criteria: (1) source; (2) context; (3) currency; (4) utility; (5) editorial review

234 process; (6) hierarchy of evidence; (7) statement of original source; (8) disclaimer, which

235 included ownership, sponsorship, funding, and advertising; (9) omissions; and (10)

236 feedback. Each criterion was scored zero if absent and one if present, total scores ranged

237 from zero to 10. Webpages were considered credible if they achieved scores  $\geq 7$ .(16)



238

239 The DISCERN instrument developed by the National Health Service Executive Research  
240 and Development Programme consists of 16 questions and is used to assess reliability of  
241 written information regarding treatment choices.(14) Questions one to eight assess the  
242 reliability and dependability of information, questions nine to 13 and 15 specifically assess  
243 information on treatment options. For this study, question 14 was excluded as no treatment  
244 is not a recommended management strategy in the event of an obstetric anal sphincter  
245 injury. Question 16 is an overall global rating. These questions are scored on a Likert scale  
246 anchored between one (low quality) to five (high quality). Total scores ranged from 15 to 75  
247 and were arbitrary grouped: very poor (15–26), poor (27–38), moderate (39–50), good (51–  
248 62), and excellent (63–75) (17,18).

249

250 The Flesch-Reading Ease Score and Flesch-Kincaid Grade level, were used to assess the  
251 readability of webpages. The Flesch-Reading Ease score was calculated using a validated  
252 formula using an online readability calculator (<https://readable.io>). Flesch-Reading Ease  
253 scores ranged from zero to 100, with higher scores indicating easier reading.(15) It has been  
254 recommended health information should achieve a Flesch-Reading Ease score below 70.  
255 Flesch-Kincaid Grade level are based on the United States grade levels and range from one  
256 to 12 and were calculated using an online readability calculator (<https://readable.io>). It has  
257 been recommended health information should not exceed a level above seventh grade.(19)

258

### 259 **Data analysis**

260 Scores obtained for accuracy, credibility, reliability, and readability from each researcher  
261 were averaged and presented as means, standard deviation (SD), and percentages. Inter-  
262 rater reliability of assessments was tested for agreement using intra-class co-efficient.  
263 Scores less than 0.2 indicated poor agreement, 0.6 to 0.8 indicated good, and greater than  
264 0.8 indicated very good agreement.(20)

265

## 266 **Results**

267 Our search strategy identified 1,198 webpages. After excluding 768 duplicate records, 430  
268 webpages were screened. Fifty-eight webpages met the study's inclusion criteria.

269

### 270 **Webpage characteristics**

271 Twenty-seven webpages (47%) were published in the United Kingdom (Appendix B). Most  
272 webpages (54/58; 93%) stated a privacy statement, 20 webpages (34%) attributed  
273 authorship, and 27 webpages (46%) were government funded. Fifteen webpages (25%) had  
274 obtained Health-Online the Net certification or Information Standard approval.

275

### 276 **Accuracy**

277 The intra-class coefficient between researcher VG and VP was 0.98 (95% CI 0.96 – 0.99).  
278 A single webpage (1%) fulfilled the entire criteria for accuracy: tamesidehospital.nhs.uk. The  
279 definition of obstetric anal sphincter injury was among the criteria communicated most  
280 frequently and accurately by webpages (53 webpages, 91%). Webpages performed poorly  
281 when considering preventative strategies (23 webpages; 39%), risk factors (23 webpages;  
282 39%), diagnosis (16 webpages; 27%), and prognosis (12 webpages; 20%). Webpages  
283 frequently reported information regarding surgical treatment (43 webpages; 74%) and post-  
284 operative management (44 webpages; 75%), and future childbirth (25 webpages; 43%)

285

### 286 **Credibility**

287 Twenty-nine webpages (50%) were assessed as credible. A third of webpages (17  
288 webpages, 30%) were accredited by The Information Standard or Health-Online the Net. All  
289 webpages provided information regarding the source of information. Fifty-one webpages  
290 (87%) were frequently assessed as being useful and fit for purpose and 44 webpages (75%)  
291 presented evidence for the information provided. Webpages performed well with regards to  
292 content (53 webpages; 91%) and data of publication and intentions to update (42 webpages;

293 72%). Over half of webpages (30 webpages, 52%) were assessed as containing information  
294 regarding author credentials including affiliations. Thirty webpages (51%) provided an  
295 opportunity for users to provide feedback. Funding and sponsorship was infrequently  
296 reported (16 webpages; 27%).

297

### 298 **Reliability**

299 The intra-class coefficient between researchers VG and VP was 0.94 (95% CI 0.89-0.96).

300 No webpage consistently performed well across assessment domains. Twenty-one  
301 webpages (36%) were assessed as poor or very poor. Forty-nine webpages (84%)  
302 explained the operative technique for obstetric anal sphincter injury repair. Forty-three  
303 webpages (74%) described the benefits of operative repair and 38 webpages (65%)  
304 described the risks. Forty-three webpages (74%) described aspects of quality of life. Fifty-  
305 five webpages (94%) were assessed as providing no information regarding long-term  
306 morbidity associated with no treatment.

307

### 308 **Readability**

309 When considering the Flesch-Reading Ease Score for included webpage, no webpage met  
310 the recommended Flesch-Reading Ease Score below 70. When considering the Flesch-  
311 Kincaid Grade level for included webpages, two webpages mayoclinic.org and  
312 babycentre.co.uk met the recommended seventh grade reading level.

313

### 314 **Comment**

315

### 316 **Main findings**

317 A minority of webpages had obtained Health-Online the Net certification or Information  
318 Standard approval. No webpage performed consistently well over the four domains of  
319 assessment. One webpage provided accurate information. Most webpages provided no

320 information regarding risk factors, diagnosis, and prognosis. Webpages performed better  
321 with regards to credibility, for example webpages were frequently assessed as being useful,  
322 highlighted research evidence relevant to the information being presented, and provided  
323 information regarding author credentials and affiliations. Over a third were assessed as  
324 unreliable, however, many webpages did describe the benefits of operative repair, discussed  
325 quality of life, and provided information with regards to future health. Only two webpages  
326 were assessed as being written in plain English.

327

### 328 **Strengths and weaknesses**

329 To our knowledge, this is the first study to examine the accuracy, credibility, reliability, and  
330 readability of online information concerning obstetric anal sphincter injury. We used a  
331 comprehensive search strategy to identify webpages relevant to obstetric anal sphincter  
332 injury. Validated instruments were used to assess credibility, reliability, and readability.  
333 Webpage assessment was undertaken by two researchers independently, with evidence of  
334 good inter-rater agreement.

335

336 Several study limitations exist. We limited our search to webpages written in English, it is  
337 challenging to draw any firm conclusions regarding webpages written in other languages.  
338 We limited our search to the first three pages of search results, potentially missing  
339 webpages eligible for inclusion. We cannot comment on the impact of the included  
340 webpages on the knowledge acquired or health-related decision influenced. We did not  
341 perform an assessment of webpage design or the impact of factors including presentation  
342 and ease of navigation on patient experience and education.

343

### 344 **Comparison with existing literature**

345 **Our findings are consistent with previous studies (16) (18) (21). The quality of online health**  
346 **information is poor across a range of obstetric and gynaecological topics.(21) (16) (18).**  
347 **Readability of webpages and their ability to convey information to patients was a concern**

348 among studies. Both, Tirlapur et al and Hirsch et al, concluded webpages were poorly  
349 written and unsuitable for public audiences (21) (16). Information on webpages was often  
350 incomplete and contained inaccuracies. Similar, to findings from our study, Fioretti et al  
351 found information lacked long-term prognosis and long-term complications related to  
352 caesarean section. Although, Fioretti et al assessed webpages written in Portuguese, it is  
353 significant as poor quality information is not limited to a country or language (18). Our study  
354 did not perform a sub-analysis determining the quality of online information according to  
355 organisations. However, Tirlapur et al concluded that specialist sites produced higher  
356 quality information than non-specialist sites (21). Therefore, patients should be directed to  
357 dedicated websites for further online information.

358

359 Websites that spread misinformation will always exist. We need to equip women with critical  
360 questions to assess the quality of information and arm themselves against poor and biased  
361 information. At present, there are no tools available for patients to utilise and identify high  
362 quality information to support health-related decisions.

363

364 As clinicians, we must be aware of the limitations of online literature and the language used  
365 to convey information. Due to shorter consultation times, patients may refer to online  
366 resources for further information and peer-peer support.(23) However, as demonstrated by  
367 this study and previously reported by others, online information uses language that exceeds  
368 basic literacy levels of adults (16). Thereby, online information can fail in its very purpose to  
369 inform and educate patients regarding their condition and treatment options. To effectively,  
370 utilise the internet as a health resource, clinicians should refer patients to webpages that  
371 communicate information which can be understood clearly by a lay audience.

372

373 The internet can influence and impacts our patients' decisions, beliefs and attitudes towards  
374 their health. In clinical practice, medical advice is given by qualified professionals however,  
375 online information may be produced by individuals and groups that do not have such

376 credentials. Online content can lack an evidence base, failing to reflect current practice and  
377 opinion. Patients do not have the skills to critically appraise health literature to detect  
378 unreliable, inaccurate and biased information. Such information can leave patients vulnerable  
379 and may be used to inform health decisions potentially causing harm.(24,25) Most  
380 concerning, is that a large proportion of patients will fail to discuss the knowledge acquired  
381 from the internet as they feel confident about the credibility of the source (26). Such  
382 information may be used to inform health decisions and potentially cause harm (24,25) For  
383 this reason, it is imperative that health professionals encourage discussion regarding  
384 internet findings to provide clarification or rationales for management plans that may differ  
385 from those read online. Failing to do so may result in poor adherence to treatments and a  
386 breakdown in the doctor-patient relationship.

387

388 The governance of online health information has inherent difficulties. Currently, online  
389 information is not subject to mandatory requirements or standards including a peer review  
390 process. However, codes of conduct have been developed such as the HONcode and  
391 Information Standard. Although, accreditation is voluntary they aim to guide internet users by  
392 highlighting reliable, relevant and trustworthy sources of health and medical information.  
393 This study evaluated written information however, the method of delivering online health  
394 information is changing. Increasingly, videos are being used to deliver information and  
395 although, we are familiar with appraising online written information using validated  
396 instruments. There are few studies that have appraised the quality or effectiveness of  
397 information delivered using modalities such as video, and there are currently no validated  
398 tools for such purposes. Further research is required to develop validated instruments to  
399 assess the quality of online information delivered by video and its effectiveness to inform  
400 patients.

401

402 At present the information provided on the internet does not effectively inform women about  
403 obstetric anal sphincter injury. Key aspects including long-term morbidity and prognosis are

404 often absent in current health literature. Health care professionals should clearly  
405 communicate risks and benefits as well as areas of uncertainty regarding diagnostic or  
406 therapeutic options. Women who have sought online information should be encouraged to  
407 discuss the accuracy of information. During which, patients should be made aware of the  
408 dangers of inaccurate online information and the potential adverse outcomes. Health  
409 professionals can advise patients of organisations and websites that provide high quality  
410 online information. This allows for a shared decision making during discussions that will  
411 inform women regarding future health and lifestyle choices.

412

413 It is in the interest of professional bodies and clinicians to contribute to the development of  
414 webpages. This ensures that the content published is credible, reliable and accurate.  
415 Furthermore, producers of online health information should be encouraged to adhere to  
416 regulations such as the HONcode and Information Standard. Patient-centred interventions  
417 are required to enhance online literacy and allowing patients to identify high quality health  
418 information (27).

419

## 420 **Conclusion and implications**

421 Information currently available on the internet concerning obstetric anal sphincter injury often  
422 uses language which is inappropriate for a lay audience and lacks sufficient accuracy,  
423 credibility, and reliability. Healthcare professionals should be aware that online information  
424 pertaining to obstetric anal sphincter injury is poor quality. Providers of online information  
425 should be strongly encouraged to adhere to regulations such as the Health on the Net  
426 Foundation accreditation.

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